

Under a cloud of uncertainty: Legal questions affecting Internet storage and transmission of copyright-protected video content

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The rapid growth of multimedia consumption has triggered technical, economic, and business innovations that improve the quality and accessibility of content. It has also opened new markets, promising large revenues for industry players. However, new technologies also pose new questions regarding the legal aspects of content delivery, which are often resolved through litigation between copyright owners and content distributors. The precedents set by these cases will act as a game changer in the content delivery industry and will shape the existing offerings in the market in terms of how new technologies can be deployed and what kind of pricing strategies can be associated with them. In this paper, we offer a tutorial on key copyright and communications laws and decisions related to storage and transmission of video content over the Internet. We summarize legal limitations on the deployment of new technologies and pricing mechanisms, and explain the implications of recent lawsuits. Understanding these concerns is essential for engineers engaged in designing the technical and economic aspects of video delivery systems.

INTRODUCTION

In North America, real time entertainment constitutes almost 69% of peak period downstream traffic in fixed networks and 40% in mobile networks. Netflix alone accounts for more than 36% of peak period downstream traffic in fixed networks, with YouTube, Amazon Video, and Hulu also appearing among the top ten peak period applications [1]. These services collectively

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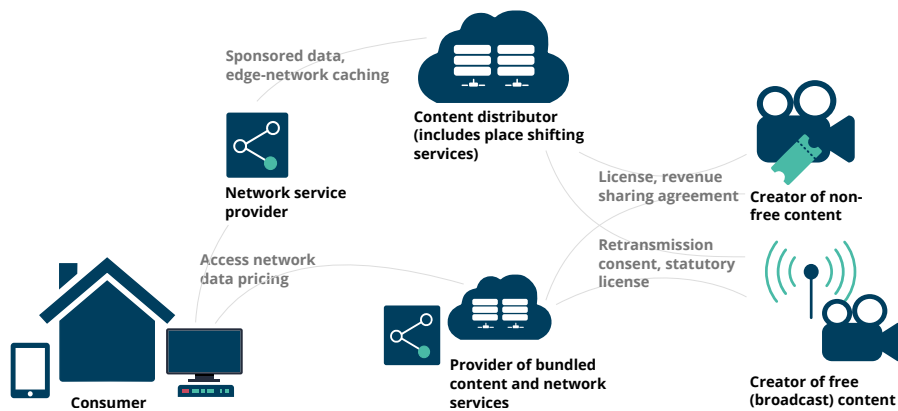


Figure 1: Delivery of multimedia content over the Internet involves financial and other relationships between several key players. The specific agreements between network service providers (Verizon, Comcast, AT&T), content distributors (Netflix, Amazon), and content creators (Disney, Sony) affect both the availability and pricing of multimedia content and network services to consumers.

are both the greatest stress on current networks (and thus, the primary contributor to costs of data delivery), and the greatest driver of demand for network services (and thus, a key component of revenue strategy for network service providers.)

Recent proposals to ease the impact of video traffic on networks include smart data pricing schemes [2] involving shifting video traffic in time or space [3,4], better content delivery networks [5], proactive caching [6], and peer to peer delivery [7,8]. Some regulatory aspects of network pricing are also well investigated (such as network neutrality [9].) However, because most of the video traffic under consideration is copyright-protected, new techniques must overcome additional legal and regulatory hurdles to be applied in practice. These have been discussed in law, economics, and policy forums, [10–12] but largely neglected in the engineering literature.

Key considerations for engineers designing technical protocols and pricing strategies for Internet content delivery include: Where is content stored? Who initiates the storage and/or transmission of content? What agreements exist between the content creator, content distributor, and network service provider? These questions are complicated by the diversity of the video content delivered over the Internet, especially as the increasing population of “cord cutters” opens a market for IPTV [13] or over-the-top delivery of traditional television content over the Internet. The ecosystem of Internet video is going to include third-party licensed video on demand, original programming included in bundles that include broadband Internet and video service, broadcast TV content on demand, and live TV content. These, in turn, involve complex relationships between content creators (Disney, Sony), content distributors (Netflix, Amazon), and network service providers (Verizon, Comcast, AT&T) as pictured in Figure 1, with associated legal challenges that affect engineering and pricing strategies.

This tutorial considers issues related to the Internet distribution of copyrighted video content in the United States. We begin with a brief overview of relevant copyright and communications legislation. Then, we discuss selected legal challenges affecting technical and economic solutions to the

content delivery problem. We conclude with a discussion of the implications for engineering future multimedia content delivery networks.

COPYRIGHT AND COMMUNICATIONS LEGISLATION IN THE UNITED STATES

In the United States, the delivery of copyrighted video content over the Internet is subject to copyright and communications law.

With respect to copyright, the 1909 Copyright Act (Public Law 60-349, 35 Stat. 1075) confers six exclusive rights upon the owner of copyrighted material. These include the right to (1) reproduce the work, (2) prepare derivative works, (3) distribute copies of the work, (4) publicly perform the work, (5) display the work publicly, and (6) perform a digital audio transmission publicly. The legal questions surrounding Internet storage and transmission focus on the copyright holders' exclusive rights of reproduction and public performance. The definitions of these terms have been revisited recently as new techniques are devised for sharing content.

Digital technology has complicated the concept of reproduction. A legal "copy" is one in which the work is "fixed" in a material object, by some method from which it can be reproduced or communicated. The advent of computer memory raises some questions regarding the definition of "fixed". Is a digital copy "fixed" if it is stored in volatile memory (RAM)? What if it is stored on a hard disk but the file descriptor is erased immediately?

Digital technology has also complicated the concept of public performance. The original definition of "public performance" in the Copyright Act was very narrow. In *Teleprompter Corp. v. Columbia Broadcasting Systems, Inc.* (415 U.S. 394 (1974)) and *Fortnightly Corp. v. United Artists Television, Inc.* (392 U.S. 390 (1968)), the United States Supreme Court decided that transmission of broadcast television via cable did not constitute a "public performance" and thus cable providers who retransmit broadcast television are not infringing. In response to these decisions, Congress amended the Copyright Act in 1976 (Public Law 94-553), expanding the definition of a "public performance" to include the transmission of a work to the public "by means of any device or process, whether the members of the public capable of receiving the performance or display receive it in the same place or in separate places and at the same time or at different times." This prevented businesses (including cable providers) from selling access to broadcasters' signals without compensation.

At the same time, Congress implemented a licensing arrangement to minimize the burden on cable providers, while still protecting broadcasters. By law, a service wishing to retransmit broadcast signals must negotiate a license from copyright providers and also gain the consent of broadcasters. However, depending on its legal classification under communications law, a service may be eligible to participate in two regulated markets that ease the burden of negotiation.

First, Sections 111, 119, and 122 of the Copyright Act (U.S. Code Title 17, Chapter 1) grant cable and satellite providers meeting certain requirements the right to retransmit broadcast television programming without negotiating with individual copyright holders. With this "compulsory license," the provider either pays set (regulated, below market rate) royalty fees which are collected by the United States Copyright Office and then distributed to the copyright holders, or is entitled to a royalty-free license.

Another set of laws apply to negotiations between the broadcaster and the retransmitter. The Communications Act (CFR, Title 47, Chapter I, Subchapter C, Part 76, Subpart D, Section 76) requires businesses classified as multi-

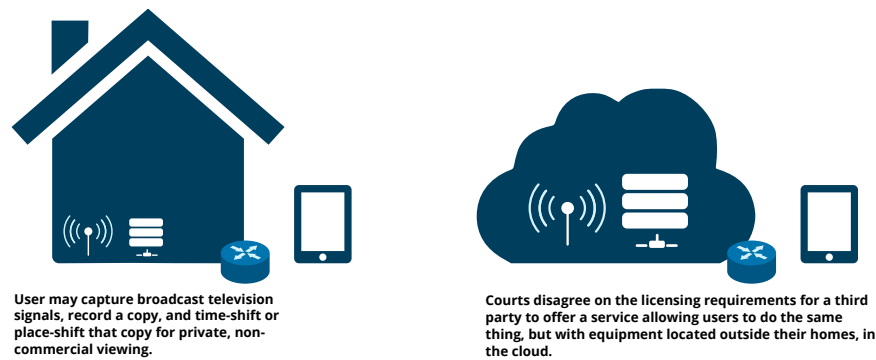


Figure 2: While the courts' interpretation of copyright and communications law allows consumers to record video content for personal use in their own homes (*Betamax*) or stream video from their home set-top boxes to another device they own (*Fox Broadcasting Co. v. Dish Network, LLC*), the courts have been divided on the status of cloud services engaged in similar practices (*Cablevision, ivi, Aereo*).

channel video programming distributors (MVPDs) to get "retransmission consent" to retransmit broadcast television signals. (This is distinct from the license agreement with the copyright holder.) Retransmission consent may involve compensation from the retransmitter to the broadcaster. Alternatively, eligible television broadcast stations may elect not to require retransmission consent, instead participating in a "must carry" arrangement which under some conditions may require a cable operator that serves the same market to carry its signal.

The implications of these laws for cloud services is not clear. While case law is well established with respect to what end users or cable providers may do with video, courts are divided on how to apply this to Internet-based services (as in Figure 2). Some approaches to smart data pricing depend on cloud content providers' ability to freely shift data in time and/or space, and negotiate on fair terms with Internet service providers that carry their content. The courts' interpretation of copyright and communications law for cloud providers has a major impact on the licensing structures and costs associated with each of these approaches.

TIME-SHIFTING SERVICES, AT HOME AND IN THE CLOUD

Many solutions to the content delivery problem propose time-shifting content delivery, in order to smooth traffic during peak periods [3]. Smart pricing schemes may encourage users to modulate their viewing habits and make delivery time more flexible for network service providers. However, it is unclear under what conditions a service engaging in this practice infringes the rights of the copyright holder (in which case, it would require a potentially costly license that might negate the savings associated with time-shifting).

Given that the exclusive rights to reproduction and public performance are held by the copyright owner, is a broadband service provider allowed to store copyrighted content for users in the "cloud" and deliver it to them later, on request? The key precedents in the United States are the 1984 Supreme Court decision in *Sony Corp. of America v. Universal City Studios, Inc. (Betamax)* (464 U.S. 417 (1984)) and the 2008 Second Circuit decision in *Cartoon Network LP v. CSC Holdings Inc. (Cablevision)* (536 F.3d 121 (2d Cir. 2008)).

Sony Corp. of America v. Universal City Studios, Inc. (Betamax)

In 1979, Sony was sued by members of the film industry for its role in developing the Betamax VCR. The plaintiffs claimed that because Sony was manufacturing a device that could be used for copyright infringement, they were liable for infringement committed by its customers. The Supreme Court decision found Sony not liable because the Betamax VCR had non-infringing uses, and concluded that “private, noncommercial time-shifting in the home” is fair use and does not infringe on the reproduction right.

Betamax addresses two key questions with implications for future cloud services:

- *Can a company be held liable for infringement if the service it provides has both infringing and non-infringing uses?* The court decided that the Betamax VCR had significant non-infringing uses, for example making copies of televised content with permission of the copyright holder, and that Sony was therefore not liable for potential infringement.
- *May a viewer time-shift video content without the authorization of the copyright holder?* The court further decided that time-shifting television for private, non-commercial use in the home is permitted even without the authorization of the copyright holder, as it “merely enables a viewer to see such a work which he had been invited to witness in its entirety free of charge.”

Later legislation (notably the Digital Millenium Copyright Act) and case law modified the Sony decision in several ways. In *A&M Records, Inc. v. Napster, Inc.* (239 F.3d 1004 (9th Cir. 2001)), an appeals court found that Napster *could* be held liable for contributory infringement because it was able to monitor and control users’ activities. Similarly, in *MGM Studios, Inc. v. Grokster, Ltd.* (545 U.S. 913 (2005)), the Supreme Court decided that Grokster could be liable for inducing copyright infringement (despite having non-infringing uses) because Grokster advertised and instructed users on engaging in infringement.

Cartoon Network LP v. CSC Holdings Inc. (Cablevision)

In 2008, a consortium of copyright holders sued Cablevision for its Remote Storage DVR (RS-DVR) service. Cablevision routed the multimedia data stream going to subscribers through a Broadband Media Router (BMR), where it was buffered for at most 1.2 seconds while the system checked if any customers had requested a copy. If a subscriber had requested a particular program, it would be stored on a portion of a hard disk allocated to that subscriber in Cablevision’s cloud data center, from which the subscriber could later view it.

The lawsuit alleged direct copyright infringement, excluding the topic of contributory copyright infringement. In turn, Cablevision waived any defense based on fair use. Thus, the precedent set by *Betamax* is largely orthogonal to *Cablevision*.

The court sided with Cablevision, setting key precedents in three areas:

- *A copy of “transitory” duration does not infringe on the reproduction right.* Because Cablevision held content in its BMR buffer for no more than 1.2 seconds at any time, its buffer copy did not infringe. This is in contrast to the earlier *MAI Systems Corp. v. Peak Computer, Inc.* (991 F.2d

511 (9th Cir. 1993)), where the Ninth Circuit found that a copy held in volatile memory *did* infringe.

- If a customer issues the command to copy directly to a copying service, then the customer (not the service) is liable for the copy. Although the copy stored on the hard disk *was* a reproduction in the legal sense, the court agreed that the customer, not Cablevision, was responsible for making the copy. This decision establishes *volitional action* as a key element shielding cloud providers from liability for their users' actions.
- A system that transmits to a single subscriber using a single unique copy produced by that subscriber does not constitute a "public" performance. The court made the determination of whether a performance is "public" based on the audience of the *particular copy* of the work.

This decision is important for establishing copyright liability protection for cloud providers, but the precedent it sets is limited. The protection against liability established by *Cablevision* is based on the grounds that the user directly initiates the copy; this protection would not necessarily apply to systems that proactively fetch content without an explicit request from the user. Similarly, based on *Cablevision*, a network service provider that caches popular content at the edge of a network might need to store one copy per user, or else negotiate a license for public performance of the content.

Impact of time-shifting on data pricing

The case law established by *Cablevision* and *Betamax* mostly affects smart data pricing techniques that involve time-dependent pricing [3]. These may be more or less problematic depending on their implementation:

- Pricing strategies that encourage users to change their viewing habits by deferring *consumption* to off-peak times are not likely to be problematic.
- Pricing strategies that encourage users to pre-fetch content in off-peak times may be problematic in some cases. *Betamax* established that pre-fetching is permitted for private, non-commercial use in the home, but not necessarily for other uses. Furthermore, if the service provider creates a non-transitory copy that is not user-initiated in order to facilitate the technical process of pre-fetching, the precedent set by *Cablevision* protecting the service provider from liability may not apply.
- Pricing strategies in which content is proactively pre-fetched (e.g. based on predictions of content that is likely to be of interest to the consumer) during off-peak times without the user initiating the download can be problematic, as the precedent set by *Cablevision* requires volitional action on the part of the user to protect the service provider from liability.

"X WITH A LONG CORD:" PLACE-SHIFTING SERVICES

While *Betamax* and *Cablevision* addressed the issue of time-shifting, *Warner Bros. Entertainment Inc. v. WTV Systems, Inc.* (824 F.Supp.2d 1003 (2011)) and *Fox Broadcasting Co. v. Dish Network, LLC* (723 F.3d (9th Cir. 2013)) concern the copyright implications of place-shifting. Place-shifting allows viewers to watch video content at a place of their choosing. Typically, these services present themselves as "X with a long cord": a DVD and DVD player

rental attached to a long cord (Zediva in *Warner Bros. Entertainment Inc. v. WTV Systems, Inc.*), a television set-top box with a long cord (Slingbox in *Fox Broadcasting Co. v. Dish Network, LLC*), or a television antenna with a long cord (ivi, Aereo), for example.

Warner Bros. Entertainment Inc. v. WTV Systems, Inc.

Zediva was a service offered in 2011 that allowed customers to watch movies online by streaming a signal over the Internet from physical DVD players located in California. Customers who "rented" a DVD had exclusive access to that disk and a DVD player for up to four hours. Each disk could only be viewed by one customer at a time.

Because they did not negotiate streaming licenses, Zediva was able to offer new releases as soon as they were available on DVD, before they were licensed to streaming services such as Netflix. Also, Zediva was able to undercut competitors; customers could rent a physical disk and DVD player for \$1.99, while licensed streaming video services at the time charged between \$3.99 and \$5.99 for new releases.

Zediva's defense argued that they were identical to a brick-and-mortar rental store, which is not required to negotiate licenses from copyright owners for post-purchase rentals (under the first sale doctrine). Because the first sale doctrine is a defense only for reproduction and distribution, not public performance, the case rested on whether or not Zediva infringed on the public performance right.

The district court decided against Zediva, rejecting their first sale doctrine-based defense and noting that they were clearly operating a streaming service, not a DVD rental service. Noteworthy conclusions of the court were:

- Zediva's streaming signals were a "public performance" even though customers were using the DVDs at different times, implying that successive transmissions of a single copy to multiple viewers can be considered public performance. (In *Cablevision*, each copy was only *ever* viewed by one user.)
- The "length of the cable" may be determinative in deciding whether copyright infringement occurred. Zediva considered itself analogous to "playing back a movie from a DVD with a very long cable attached," but the court held them liable for transmission because the videos were received "beyond the place from which they are sent."

Fox Broadcasting Co. v. Dish Network, LLC

In 2013, Dish implemented a service allowing subscribers to view content from their home set top boxes over the Internet, using a streaming server installed in the home (Slingbox). This allows subscribers to view live, on-demand, or recorded content that they have access to at home, from any location.

Fox argued that Dish infringed on the public performance right. However, the district court found that because the service could only be used by subscribers to get access to their own recordings (which were considered fair use, according to *Betamax*), and because the reproduction and transmission actions were initiated by volitional action on the part of subscribers (as in *Cablevision*), there was no direct infringement. Furthermore, a user's transmission of programming from one place to another is not a public

performance because the content is already in the subscriber's possession, as is the equipment. Thus, Dish does not engage in contributory infringement by enabling this behavior.

This decision is significant, because while at face value, the Slingbox seems like just another "X with a long cord," here, the long cord carries content between equipment already in the user's possession. Thus, a long cord connecting a user's device to the cloud is not equivalent to a long cord connecting two devices belonging to the same user across the Internet.

Impact of place-shifting on data pricing

Place-shifting affects smart data pricing strategies by changing the dynamics of cost and demand in the ecosystem of Figure 1. The agreements between a place-shifting service and content creators (e.g. license agreements, revenue sharing contracts) affect the cost, value, and availability of the service. This in turn influences the prices of data services, as the network service provider acts as a platform for delivery of the content.

Place-shifting services in which content is stored in the cloud can potentially reduce the acquisition and storage costs of the content distributor. These savings can trickle down and generate consumer surplus that may influence data purchasing decisions. However, the legality of services that do not specifically negotiate licenses for cloud streaming (as in Zediva) is uncertain, especially when a single copy of the content is transmitted to multiple users (i.e., when the savings to the content distributor are greatest.) Content distributors that negotiate a license in the face of this uncertainty pass on higher licensing costs to consumers.

Place-shifting services that allow mobile users to access content that they previously could only view at home (like Slingbox) may shift demand from inexpensive home broadband networks to relatively expensive cellular networks, partially negating smart data pricing strategies that rely on the ability to shift demand in the opposite direction. Again, the affordability of these services (and thus, their impact on data pricing) varies depending on whether or not place-shifting services must negotiate licenses, since those licensing costs are typically passed on to consumers.

Finally, place-shifting also includes time-shifting, so considerations related to time-shifting and data pricing also apply.

SCHRÖDINGER'S CABLE DUCK: INTERNET DELIVERY OF BROADCAST TELEVISION

Even more than other forms of time-shifting and place-shifting, the application of copyright law to cloud-based services that retransmit broadcast television over the Internet has been confusing and contradictory. The key point of debate is the classification of these services under communications law. This has been the subject of recent litigation involving two services, *ivi* and *Aereo*, which we briefly describe here. A related service called "FilmOn" is still enmeshed in active litigation.

WPIX, Inc. v. ivi, Inc.

ivi, Inc. was a cloud service that allowed subscribers to watch local broadcast TV from several U.S. cities for a monthly fee of \$4.99 (with an option to also purchase a recording service for additional \$0.99). It was sued by a group of copyright holders and broadcasters one week after beginning

retransmissions. A district court (765 F. Supp. 2d 594 (S.D.N.Y. 2011)) and an appeals court (No. 11-788 (2d Cir. 2012)) decided against ivi, forcing them to cease operations.

ivi argued that they should be classified as a cable system, making them eligible for the compulsory license under §111 and freeing them from the requirement to negotiate with copyright holders. The court indicated that it is unclear based solely on the text of the Copyright Act whether ivi should be considered a cable system. Thus, in ruling against ivi, the court based its decision on the following considerations:

- The intent of Congress in enacting §111 was to improve access for communities that were underserved by broadcast signals. Because Internet-based retransmission is not localized and is not intended mainly to support remote areas, the court found that Congress did not intend for Internet retransmission services to be eligible for compulsory licenses under §111.
- The United States Copyright Office has not interpreted §111's compulsory licenses to include Internet retransmission, which they have said they consider to be "vastly different" from other retransmitters who are eligible.

American Broadcasting Companies v. Aereo

Aereo allowed subscribers to stream broadcast television over the Internet for \$8/month. The creators of Aereo designed the service specifically to avoid infringing on reproduction or public performance rights, using the precedent set by *Cablevision*. Aereo set up an "antenna farm" in a warehouse in New York. Users of the service "rented" an individual antenna and were also offered a VCR service, allowing them to store copies of television programs for later streaming.

As in *Cablevision*, the users engaged in volitional conduct to create a copy, no non-transitory copies except for the users' were created, and an individual copy (an individual antenna) was dedicated to each user. Aereo allowed users to access content they were already permitted to view for free over public airwaves. Both the district court and appeals court sided with Aereo, citing *Cablevision* as precedent.

However, the Supreme Court decided in favor of the broadcasters (134 S. Ct. 2498, 2511 (2014)). The court applied the "duck test" (if it looks like a duck, swims like a duck, and quacks like a duck, then it probably is a duck), arguing that Aereo had an "overwhelming likeness to cable companies" and therefore, required the consent of broadcasters to retransmit their signals.

Following this decision, the company argued that since they are a cable system, they are eligible for the compulsory copyright license. This argument was rejected by the district court (Civil Action No. 12-CV-1540 (AJN) (HBP) (S.D.N.Y. Oct. 29, 2014)), which called it a "fallacy" that "because an entity performs copyrighted works in a way similar to cable systems it must then be deemed a cable system for all other purposes of the Copyright Act." Thus Aereo became Schrödinger's cable duck: simultaneously a cable system and not a cable system. Although it was required, like a cable system, to obtain retransmission consent from broadcasters, it was not eligible for compulsory licenses from copyright holders.

A similar service, FilmOn, has been the subject of more recent, but equally contradictory, litigation. In July 2015, a Los Angeles federal district court

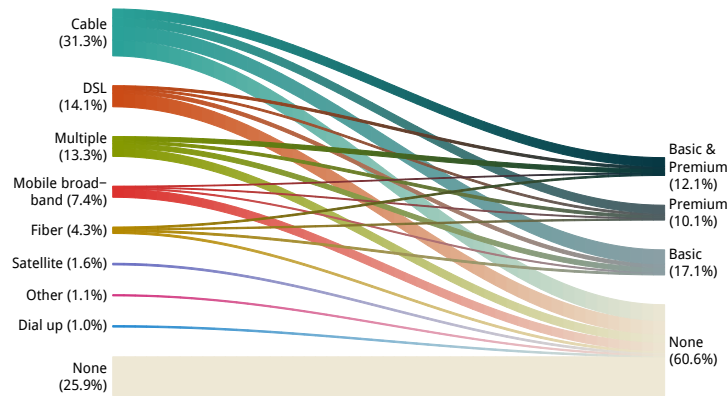


Figure 3: Close to 40% of U.S. households purchase Internet service as part of a bundle that also includes television services. On the left, we see the percentage of U.S. households who access the Internet using only cable, DSL, mobile broadband, fiber, satellite, multiple technologies, or who do not access the Internet from home. Moving towards the right, we see which of those purchase Internet service as part of a bundle including basic and/or premium television services. (Data source: July 2013 United States Census Computer and Internet Use Supplement. Percentages may not sum to 100 due to rounding.)

decided that FilmOn was entitled to the same compulsory licenses as cable companies. However, in November 2015, this judgment was rejected on appeal. The ongoing FilmOn litigation highlights how vague the Aereo ruling was, and the level of uncertainty that remains regarding retransmission of broadcast television.

Impact of Internet retransmission of television on data pricing

Smart data pricing often involves side payments and agreements between Internet-based content providers and network service providers (for example, as in sponsored data [14]) under the assumption that these are separate parties with distinct interests. However, network service providers may have a competing interest in the content delivery market; many also sell video entertainment services. Figure 3 shows that according to a July 2013 census survey, 39% of U.S. households buy Internet service as part of a “bundle” including television.

Bundles are important to cable operators, who have been losing pay-TV subscribers while the high-speed Internet user base continues to grow. The cost of an Internet service bundle including other services is higher than an equivalent stand-alone Internet plan (Figure 4). However, consumers have an increasing preference for à la carte television options or “cord cutting.” According to recent Nielsen reports, the number of “zero TV” households is on the rise, and almost half of “zero TV” households are composed of young people under the age of 35. Meanwhile, broadcast television networks remain important to viewers, with the “Big Four” still retaining a 40% average weekly reach. The coincidence of these trends makes alternative video platforms, and Internet delivery of television programming in particular, the next big front in the battle for consumer dollars.

The ecosystem shown in Figure 1 currently favors cable and satellite providers that also sell bundles including broadcast television, since these

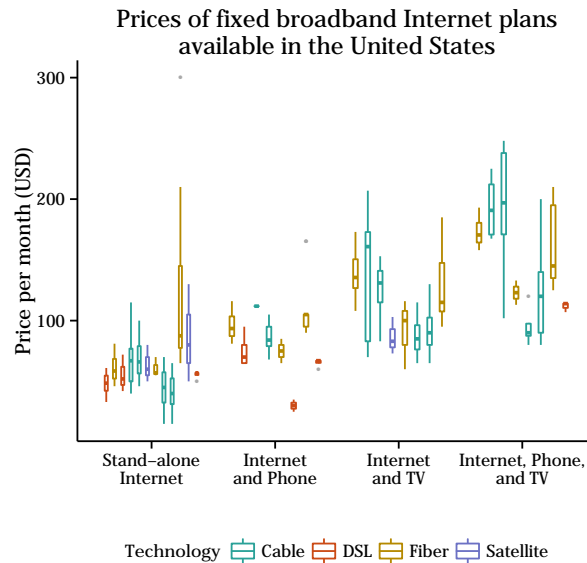


Figure 4: Prices for Internet service in the United States, grouped by technology, bundle type, and provider. The lower and upper “hinges” of the boxplot correspond to the first and third quartiles of available plans, the “whiskers” extend to $1.5\times$ the interquartile range, and outliers beyond the whiskers are plotted as points. A given provider may offer a range of plans of the same bundle type using the same technology, differentiated by data rate, cap, or number of television channels included. Not all plans are available in all U.S. markets. (Data Source: International Bureau, Fourth International Broadband Data Report, 2015.)

are entitled to compulsory licenses below market rates. These services may even have a competitive edge when selling IPTV service (i.e., not traditional cable television). By delivering this service over managed IP, not the public Internet, they can offer a better quality of service than competitors and also exempt their own service from data caps, without running into network neutrality issues that apply on public Internet. (See for example Comcast’s “Stream” product, announced July 2015.)

However, if services such as ivi, Aereo, and FilmOn were reclassified to also entitle them to compulsory licenses, the balance of this ecosystem would shift dramatically. This would affect aspects of data pricing related to transactions between content distributors and network service providers, including network neutrality [9], sponsored data [14], and app-based pricing [2].

The Federal Communications Commission (FCC) and/or Congress are likely to eventually regulate Internet streaming providers, and describe what rights and requirements apply to them. It is not clear what this regulation might look like, and whether Internet streaming providers will at that stage be on equal footing with cable providers, who are subject to regulations imposed at a time when cable services operated mainly to improve access for underserved communities.

Time-shifting		
1984	Sony Corp. of America v. Universal City Studios, Inc. (Betamax)	“Private, noncommercial time-shifting in the home” does not infringe on the reproduction right.
2008	Cartoon Network LP v. CSC Holdings Inc. (Cablevision)	Establishes protection from liability if the service provider’s copy is transitory and the user’s copy is created by volitional action on the user’s part.
Place-shifting		
2011	Warner Bros. Entertainment Inc. v. WTV Systems, Inc.	The “length of the cable” between the consumer and the content may be determinative in deciding whether copyright infringement occurs.
2013	Fox Broadcasting Co. v. Dish Network, LLC	A user’s transmission of programming from one place to another does not infringe on the public performance right when all content and equipment are in the subscriber’s possession.
Internet delivery of broadcast television		
2012	WPIX, Inc. v. ivi, Inc.	Internet-based broadcast television service ivi did not qualify for compulsory licenses to retransmit broadcast television.
2014	American Broadcasting Companies v. Aereo	Aereo’s place-shifting service required retransmission consent because they appeared too much like a cable provider, but another court judged that they did not resemble a cable provider enough to qualify for compulsory licenses.

Table 1: Highlights of significant judicial decisions in the United States related to time-shifting, place-shifting, and Internet delivery of broadcast television.

SUMMARY AND GLOBAL OUTLOOK

Table 1 summarizes key precedents set by cases discussed in this tutorial. Given these decisions, the only certainty is that cloud multimedia services remain under a cloud of uncertainty. This is a barrier to technical innovation, as without legal certainty regarding licensing requirements, companies offering new services are not able to predict costs, and investment in them is risky.

The global outlook for cloud multimedia services is similarly uncertain. Table 2 shows cloud-based multimedia services that have been the subject of litigation (often dragging on for years, at considerable expense) in Europe and Asia. These, too, have often yielded contradictory and vague decisions.

The decisions made by legislative bodies, judicial bodies, and regulatory agencies in the next few years as they apply copyright and communications law to the Internet will shape market offerings in this area, in terms of how new technologies can be deployed and what kind of pricing strategies can be associated with them. Until then, however, key questions - when and where

Location	Service	Status
France	Wizzgo	Decided in favor of content owner
United Kingdom	TV Catchup	Mixed decisions, with litigation ongoing
Finland	TVkaista	Decided in favor of content owner
Germany	Shift.TV, Save.TV	Mixed decisions, with litigation ongoing
Singapore	Record TV	Decided in favor of cloud service
Japan	Rokuraku II	Decided in favor of content owner
Australia	Optus TV Now	Decided in favor of content owner

Table 2: The global outlook for cloud multimedia services is equally uncertain. These services have been involved in extensive litigation, often with multiple appeals dragging on for years.

will network users consume multimedia content? what kinds of relationships will exist between network service providers, content distributors, and content owners? - remain unanswered.

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